

Exhibit 2 59/739087

Ktech CORPORATION

## CORPORATE

## RESEARCH &amp; DEVELOPMENT

## RESEARCH FACILITY OPERATIONS

## MANUFACTURING &amp; AUTOMATION

## INFORMATION TECHNOLOGIES

## TECHNICAL COMMUNICATIONS

## PRODUCTS

Piezoelectric Polymers

## ● Cold Spray

VALYN VISAR

Sensors &amp; Gauges

## ● UV Filters

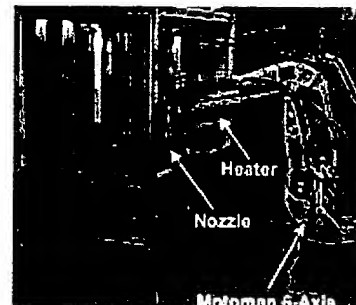
## ● Explosive Closures

Fast Gates

## TECHNICAL STAFFING SERVICES

## Cold Spray

Cold Spray processing (or simply Cold Spray) is a high-rate material deposition process in which small powder particles in solid state ("unmelted" -- typically 1 – 50 microns in diameter) are mixed with heated gas (helium, nitrogen, or air) in the range of 20 to 700 C and accelerated to supersonic velocities on the order of 600 – 1000 m/s through a de Lavell nozzle. The particles impact the target surface with sufficient kinetic energy to cause plastic deformation and consolidation with the underlying material to bond together, rapidly building up a layer of deposited material. The process is thought to be analogous to explosive welding.

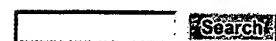


- Cold Spray Features and Benefits
- Cold Spray Equipment
- Powder Hopper
- Laboratory Powder Feeder
- Passivation System
- Gas Heater
- Gas Control Module
- Prechamber and Nozzle
- Computer Control and Data Acquisition
- We Provide...

Download Cold Spray brochure in PDF format.

## Cold Spray Features and Benefits

- Fully automated computer control
  - Process equipment
  - Data logging
  - Real time operator interaction
  - Data display of any process
- Lightweight pre-chamber and nozzle assembly
  - Accommodates nozzles with rectangular and round exit geometries
    - Lightweight resistance coil heater
    - Facilitates mounting to the end effector of a robot or Cartesian system
  - Precision gas control module
    - Regulates and measures flow of propulsion and powder feed gases (He, N<sub>2</sub>, or Air)
  - Incorporates a dual gas crossover



- High-pressure powder feeder modified for closed loop operator
- Ethernet communication
- Passivation system
- Safely controls rapid oxidation of powders in powder feed canister

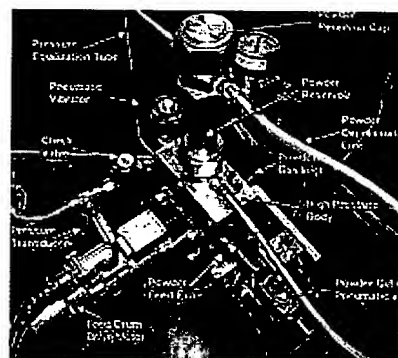
## Cold Spray Equipment

### Powder Hopper

The powder feeder is specifically designed for processes requiring extremely high operating pressures. The powder feeder delivers a continuous flow of powder to processes requiring up to 500 psi operating backpressure. The feeder has a large canister capacity, allowing for high volume, extended run time. The powder feeder controls can be integrated with Ktech's data acquisition and control system to control the rotational speed of the auger through a graphical user interface.

### Laboratory Powder Feeder

Ktech's design for uniform delivery of fine powders includes systems that deliver minimal pulsing, are easily cleaned, have small or large volume capabilities, enable a quick turnaround of different powders and are easy to use to measure deposition efficiency.



The High-Pressure Laboratory Powder Feeder can deliver fine and coarse powder materials with little or no pulsing.

### Passivation System

This system will provide for the safe removal of rapidly oxidizing powders such as aluminum from the powder feeder.

### Gas Heater

The gas heater consists of a tubular coil heated resistively by a single phase 208 V, 25KVA power supply. The tubular heating coil is housed in a thermally insulated aluminum enclosure. The housing can be mounted onto a Cartesian X-Y system or the end effector of a robot. The heater is capable of delivering 5-50 scfm of high-pressure gas up to 500 psi at temperatures of up to 500° C. The temperature at the nozzle is controlled by the data acquisition and control system via a proportional temperature device and thermocouple



Propulsion gas can be heated from ambient to 500° C in 2.5 minutes.

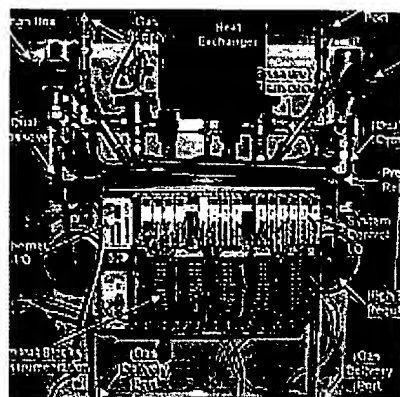
installed on the prechamber. The desired gas temperature is entered through the graphical user interface on the control console. The gas is automatically heated to the delivery temperature.

**Note:** The power supply requires chilled water flowing at 2.8 gal/min at 30 psi for cooling the transformer.

### Gas Control Module

Ktech's gas control module is designed to provide accurate gas flow to the nozzle through the main gas line and carrier gas to drive the powder from the powder hopper to the prechamber of the nozzle. Gas flow is controlled using high-pressure regulators and solenoid valves controlled by the data acquisition and control system.

Pressure transducers are installed in both the main gas and carrier gas lines. Check valves are installed for safety. The system is installed in a powder-coated Hoffman enclosure with a dual inlet connection for helium or nitrogen supply gas and two exits, one for the main gas and one for the carrier gas.



Gas Control Module provides repeatable precise monitoring of propulsion and powder feed gas up to 100 cfm.

The enclosure is configured with a blow-out panel in case of over pressurization, and a fan to eliminate gas buildup inside the enclosure. Flow meters can be installed as an option to provide a precise measure of the flow rate to the nozzle and powder feed lines.

### Prechamber and Nozzle

Ktech will provide three nozzles made of either stainless or tool steel and one out of tungsten carbide. Two nozzles will have a circular geometry and the other a rectangular geometry. The stainless and tungsten carbide nozzles will be of circular geometry having an exit diameter of 5 mm. The rectangular nozzle will be made of stainless steel and have an exit geometry of approximately 10 mm x 2 mm. The nozzles are designed to quickly attach to the prechamber. The prechamber will mount directly to the exit of the heater coil using Swagelok fittings or the end effector of a multi-axis robot.

### Computer Control and Data Acquisition

The data acquisition and control system will consist of the 500 MHz, Pentium III processor, 17 inch monitor, control and communication hardware, LabView source software, and required programming for controlling the powder hopper, gas heater, and gas control module. The data acquisition system can also provide remote control of optional devices such as Cartesian X-Y system, robot,

dust collector, spindle motor, turn table, etc. if purchased with the system.

#### **We Provide**

##### **Systems Engineering/ Qualification**

Facilities survey, nonrecurring engineering, systems integration, testing, and qualification, documentation, crating and preparing components for shipping at Ktech.

##### **Crating and Shipping**

Preparation of the equipment for shipping, crating, and freight costs for shipping the equipment to the customer's facility.

##### **System Installation and Training**

Installation and commissioning of the above equipment in the customers facility and training of customer on the system operation. (Provided on a time and materials basis.)

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